IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Robert M. Tessari Bruce D. Houtchens
Serial No:	[NEW]
Filing Date:	March 12, 2004
Title:	METHOD AND APPARATUS FOR DRILLING A BOREHOLE WITH A BOREHOLE LINER
Group:	
Examiner:	
Attorney Docket No.:	CBENN.00006

DECLARATION OF WILLIAM S. WANG IN SUPPORT OF PETITION FOR RETROACTIVE LICENSE

In accordance with the provisions of 37 C.F.R. § 5.25, the undersigned hereby makes the following written statement:

1. My name is William S. Wang, I am over the age of twenty-one and fully competent to make the following statement and have firsthand knowledge of the facts set herein.

2. I am an attorney at the law firm of Carstens, Yee & Cahoon, L.L.P., the law firm representing the inventors with respect to the above-identified Patent Application (the "Application").

3. I am a registered patent agent, Registration No. 52,341.

4. On March 1, 2004, Roseann Caldwell, a patent agent of the Canadian firm Bennett Jones, L.L.P., contacted our firm stating that she had just learned that the subject matter disclosed in three patent applications filed in Canada on March 13, March 31, and April 17 of 2003 may have been invented in the U.S.

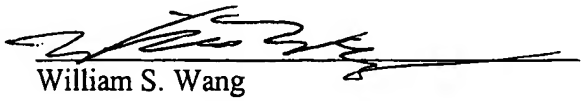
5. On the same day, March 1, 2004, our firm recommended to Ms. Caldwell that a U.S. Application claiming priority to the Canadian applications be filed along with a Petition for Retroactive License.

6. On March 11, 2004, I received from Ms. Caldwell the Patent Application Specification, Claims, and Drawings that consolidated the subject matter disclosed in the three Canadian applications, which we were instructed to file with the USPTO.

7. I immediately prepared transmittal papers for the U.S. Patent Application and filed the Application with the USPTO on March 12, 2004.

8. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements are made with the knowledge that willful false statements and that like so made are punishable by fine or imprisonment, or both, under Section 1001, Title 19 of the United States Code, and that such willful false statements may jeopardize the validity of the Application or any patent issuing thereon.

Signed this 12th day of March 2004.

By: 
William S. Wang

Information in Support of a Petition for Retroactive Foreign Filing License

Regarding patent application materials for subject matter relating to a method and apparatus for drilling a borehole with a borehole liner:

37 CFR 5.25(a)(1) and (2)
Patent application materials describing various aspects of the subject matter were filed in Canada as follows:

> Canadian 2,422,150, filed March 13, 2003 and entitled METHOD AND APPARATUS FOR DRILLING A BOREHOLE WITH A BOREHOLE LINER
>
> Canadian 2,424,337, filed March 31, 2003 and entitled LINER DRILLING AND CEMENTING TOOL
>
> Canadian 2,429,076, filed April 17, 2003 and entitled REVERSE CIRCULATION LINER DRILLING TOOL

Copies of those patent application materials are enclosed as items A, B and C, along with their filing receipts.

37 CFR 5.25(a)(3)(i)
The subject matter in question was not under a secrecy order at the time it was filed abroad and the subject matter in question is not currently under a secrecy order.

37 CFR 5.25(a)(3)(ii)
The retroactive license for foreign filing has been diligently sought after discovery that the subject matter may have been invented in the United States and that the subject matter was first filed in an application outside the United States. In particular, I first discovered that the subject matter may have been invented in the United States on February 26, 2004 when I learned that one of the inventors Bruce Houtchens resided in Spring, Texas. At that time, I realized that the other joint inventor, although a resident of Canada, was in Texas for significant periods during 2003. A copy of the email of February 26, 2004, reporting Mr. Houtchens residence, is attached as item D.

Over the weekend of February 28 and 29, 2004, I thought about the invention and the plan for foreign filing and began to realize that the filings had been done without the benefit of a US foreign filing license. Thus, on March 1, 2004 when returning to work, I contacted our US Attorneys for assistance with a strategy for obtaining a foreign filing license.

Once I received advice from our US associates that it was possible to file a petition for retroactive foreign filing license, I proceeded to prepare a formal patent application consolidating the subject matter from the three above-noted Canadian applications.

I contacted our US associate on March 10, 2004 with instructions to file the formal patent application in the United States Patent and Trademark Office with a petition for retroactive license.

37 CFR 5.25(a)(3)(iii)

The material was filed abroad through error and without deceptive intent without the required foreign filing license first having been obtained.

In particular, I was unaware that the subject matter may have been invented in the US until February 26, 2004, well after the patent application materials were actually filed abroad.

The assignee of the patent application materials is TESCO Corporation, a company incorporated and with a corporate head office in Alberta, Canada. I do all of the originating patent work for the company and am located in Alberta, Canada. In the spring of 2003, although the company had an office in Houston, Texas, the company's patent manager operated out of the corporate head office and most research and development personnel were located in Alberta, Canada. All instructions and disclosures of the subject matter contained in the above-noted patent application materials were sent to me by the patent manager from the corporate head office.

In each filing, it was necessary to file the material quickly in order to obtain the earliest possible filing dates. With respect to the filing of March 13, 2004, a disclosure of the invention was received on March 10, 2003 with instruction to file a patent application immediately. Copies of the emails of March 10, 2003 are attached as items E. The application was prepared in three days with assistance by the patent manager and filed on March 13, 2003. Although a US provisional filing was contemplated in accordance with normal practice, a Canadian application was filed since we were able to obtain an instant filing date.

The inventor's names were provided to me on March 12, 2003. The Canadian filing required only a contact address for the inventors and so the corporate head office address was used for filing. Based on my previous work with the company, it did not even occur to me that the invention may have been made in the United States and such a question was not asked of the patent manager.

With respect to the filing of March 31, 2003, the material of the application was provided to me that morning by the patent manager in the corporate head office. A patent application containing the patent application materials was filed in Canada on the afternoon of March 31, again because an instant filing date could be obtained. Copies of the instructing and responding emails are attached as items F. The emails have been amended to remove confidential information.

With respect to the filing of April 17, 2003, again the material of the application was sent to me in the morning and was filed in the afternoon. In order to obtain the earliest possible filing date, the patent application materials were filed in Canada. A copy of the instructing/responding email is attached as item G.

I am prepared to sign an Oath or Declaration containing any or all of the above-noted information.

If further information or evidence is required, please let me know.

Roseann Caldwell
Registered Canadian and United States Patent Agent
USPTO Reg. no. 37,077
Date: March 10, 2004

Office de la propriété intellectuelle du Canada
l'organisme d'Industrie Canada
www.opic.gc.ca

Canadian Intellectual Property Office
An Agency of Industry Canada
www.cipo.gc.ca

A

BENNETT JONES LLP
4500 Bankers Hall East
855 - 2nd Street S.W.
CALGARY Alberta
T2P 4K7

Date : 2003/04/09

FILING CERTIFICATE

Application No.	: 2,422,150	**Filing Date**	: 2003/03/13
Expected Laid-Open Date	: 2004/09/13	**Your Reference**	: 32361-182

Title of Invention : METHOD AND APPARATUS FOR DRILLING A BOREHOLE WITH A BOREHOLE LINER

Applicant(s) : TESCO CORPORATION

Inventor(s) : TESSARI, ROBERT; HOUTCHENS, BRUCE

Special Notice

You are reminded that annual fees to maintain your application are needed for each one-year period between the 2nd and 20th anniversaries and must be paid on or before each anniversary. Failure to pay within the prescribed time limit will lead to abandonment of your application.

DOCKETED

Commissioner of Patents

Canada

OPIC CIPO

BENNETT JONES

Bennett Jones LLP
4500 Bankers Hall East
855 2nd Street SW
Calgary Alberta
Canada T2P 4K7
Tel 403.298.3100
Fax 403.265.7219

March 13, 2003

The Commissioner of Patents,
Ottawa/Hull, Canada,
K1A 0C9.

Attention: Filing Section

Dear Sir:

Re: New Canadian Patent Application in the name of TESCO CORPORATION entitled " METHOD AND APPARATUS FOR DRILLING A BOREHOLE WITH A BOREHOLE LINER "
Our File: 32361-182

We enclose herewith for filing a new Canadian patent application as follows:

Petition
Specification
Drawing Sheets

The Commissioner is authorized to charge the official filing fee of $300.00 for a large entity to deposit account 6 000 000 15.

Respectfully submitted,

BENNETT JONES LLP

Roseann B. Caldwell:cb
Encls.

Canada - Petition for Grant of a Patent

File No: 32361-182B

1. The applicant, TESCO CORPORATION, whose complete address is 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA, requests the grant of a patent for an invention, entitled LINER DRILLING AND CEMENTING TOOL, which is described and claimed in the accompanying specification.

2. The inventor(s) is/are (1), TESSARI, Robert and (2) HOUTCHENS, Bruce whose complete address(es) is/are (1) 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA, and (2) 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA and the applicant owns in Canada the whole interest in the invention.

3. The applicant requests priority in respect of the application on the basis of the following previously regularly filed application:

Country of filing	*Application number*	*Filing date*

4. The applicant appoints BENNETT JONES LLP, whose complete address in Canada is 4500 Bankers Hall East, 855 - 2nd Street S.W. Calgary, Alberta, T2P 4K7, telephone (403) 298-3661, facsimile (403) 265-7219, as the applicant's representative in Canada, pursuant to section 29 of the *Patent Act*.

5. The applicant appoints BENNETT JONES LLP, whose complete address is 4500 Bankers Hall East, 855 - 2nd Street S.W. Calgary, Alberta, T2P 4K7, telephone (403) 298-3661, facsimile (403) 265-7219, as the applicant's patent agent.

6. The applicant requests that Figure No. 1 of the drawings accompany the abstract when it is open to public inspection under section 10 of the *Patent Act* or published.

SIGNED at Calgary, Alberta, this 31ST day of March, 2003.

TESCO CORPORATION

By: _____
BENNETT JONES LLP
Patent Agents for Applicant

PD105

METHOD AND APPARATUS FOR DRILLING A BOREHOLE WITH A BOREHOLE LINER

Field of the Invention

The invention relates to methods for drilling well bores and in particular methods for drilling a wellbore using a drilling liner.

Background of the Invention

A drilling liner can be carried along behind the pilot bit to line a borehole while it is being drilled. Previously drilling fluid has been circulated down through a drill pipe, through the pilot bit and up the outer annulus between the drilling liner and the borehole wall. Alternately, in other methods, the drilling fluid is circulated down through the drill pipe and forced up through the liner by sealing between the liner and the borehole wall.

In previous methods, drilling with a liner was often not successful, primarily due to drilling fluid pressure losses arising between the bit and the casing. These pressure losses required the use of very high pressures at the bit, which adversely affected drilling success.

Summary of the Invention

In accordance with the present invention, there is provided a method for drilling a borehole comprising: providing a drill string of drill pipe including a center bore and a distal end; a pilot bit at the drill string's distal end and an under reamer for drilling behind the pilot bit; hanging a liner from the drill string, thereby forming an annular space between the drill string and the liner and a second annular space between the liner and the borehole wall; circulating drilling fluid down through the center bore of the drill string out through the pilot bit and through the second annular space between the liner and the borehole wall, and up through the annular space between the drill string and the liner.

In accordance with another aspect of the present invention, there is provided an apparatus for drilling a borehole, the apparatus comprising: a drill string of drill pipe including a center bore and a distal end; a pilot bit at the drill string's distal end; an under reamer on the drill string and spaced behind the pilot bit; a liner including an inner bore and arranged with the drill string extending through the liner inner bore; a ported sub mounted between the drill string and the liner to support the liner on the drill string and including a first port for providing fluid communication between the drill string center bore and the outer surface of liner and a second port for providing fluid communication between the liner inner bore and an upper surface of the sub; and a seal extending about the ported sub to seal against fluid communication between the first port and the second port.

In accordance with another aspect of the present invention, there is provided an apparatus for drilling a borehole, the apparatus comprising: a drill string of drill pipe including a center bore and a distal end; a pilot bit at the drill string's distal end; an under reamer on the drill string and spaced behind the pilot bit; a liner including an inner bore and arranged with the drill string extending through the liner inner bore; a ported sub mounted between the drill string and the liner to support the liner on the drill string and including a port for providing fluid communication between the liner inner bore and an upper surface of the sub; and a seal adjacent the upper end of the liner and selected to seal against fluid flow upwardly past the liner upper end through the annulus between the liner and the borehole wall such that fluid in the annulus between the liner and the borehole wall below the seal creates a fluid lock against drilling fluid returning to surface through the annulus about the liner.

Brief Description of the Drawings

Figure 1 is a schematic sectional view along a wellbore including a drilling system including a drilling liner and showing a method according to the present invention.

Figure 2 is a schematic sectional view along a wellbore including another drilling system including a drilling liner and showing another method according to the present invention.

Figure 3 is a schematic section view along a wellbore showing another drilling apparatus and method according to the present invention.

Detailed Description of the Preferred Embodiments

Drilling with a liner can be accomplished by drilling the liner in place using a conventional drill string 10 formed of drill pipe or coiled tubing. Drill string 10 extends from surface to the bottom 12 of the hole, includes a center bore 13 and can include conventional drilling tools including, for example, a pilot bit 14 and an under reamer 16 driven by a bottom hole assembly 17 including a mud motor. A liner 18 is hung onto drill string 10 by a ported sub 20. Preferably, ported sub 20 is connected at the up hole end of the liner, while the lower end of the liner is open about the drill string or ported to allow fluid therein. A liner hanger 19 is provided to support liner 18 within casing liner 22, when it is desired to set the liner.

→ Run in all 186.

As drilling commences, the fluid, initially provided through drill string 10, is split to both (i) flow F1 down through the inside of drill string 10 and (ii) flow F2 down through the annulus about the outside of liner 18. Fluid then returns F3 up through the annulus between drill string 10 and liner 18. Fluid passes through ported sub 20 and returns to surface through the annulus F4 between the borehole wall or casing liner 22 and the drill string. The flow F1 provides that there is enough fluid to drive and lubricate pilot bit 14 and under reamer 16 while flow F2 prevents flow up the annulus between the liner and the borehole and forces all drilling fluid to pass up between the liner and the drill string. It has been found that flow through this annular space causes less pressure loss than flow through the annular space between the liner and the borehole wall.

Ported sub 20 can include at least one port 24 through which the fluid flow is split. Port 24 opens between drill string center bore 13 and the outer surface of liner 18 so that fluid

can be diverted from the drill string inner bore to the annular space about the liner. Preferably, the flow through port is controlled so that only a portion of the flow passes through that port with the remainder continuing down through center bore 13 to the pilot bit. For example, a flow restrictor 25 can be installed in port 24 to provide resistance to fluid flow through the port.

Ported sub 20 also includes at least one port 26 through which flow F3 can pass. Ports 26 are sized to permit cuttings to pass.

Ported sub 20 carries a seal 28 such as a packer or swab cups so that fluid is prevented from passing about the liner hanger and prevented from communication between ports 24 and 26, thereby permitting fluid circulation to be controlled about the liner hanger.

Preferably, the drilling is conducted through a borehole liner, such as casing liner 22, that is already cemented in the hole. The drilling proceeds using the above-noted circulation until the liner reaches casing point, which is the point at which it was desired to set the liner in the borehole. The liner can be any length L in order to achieve a selected extension beyond the lower end 30 of the installed casing.

When the liner reaches casing point, the liner can be hung in the casing string, for example adjacent lower end 30, by actuation of liner hanger 19. Ported sub 20 and drill string 10, with attached pilot bit 14 and under reamer 16, can be retrieved through the liner and pulled from the well bore. The under reamer, when expanded, cuts a borehole greater than the outer diameter of the liner, but can be collapsed to be withdrawn through the liner. Thereafter, the drill string can be reintroduced to the liner for cementing through the drill string. In one embodiment, it may be desirable that the drill string and ported sub 20 be removable from the liner at selected times during the drilling process, for example, when it is necessary to replace or repair a bit, under reamer or bottom hole assembly component. The ported sub 20 would then be reconnectable to the liner and the liner hanger would need to be reversibly drivable to release from engagement with the casing.

Referring to Figure 2, there is shown another drilling assembly and method according to the present invention. A liner 18 can be drilled in place using a conventional drill string 10 formed of drill pipe. Drill string 10 extends from surface to the bottom 12 of the hole and can include conventional drilling tools including, for example, a pilot bit 14 and an under reamer 16 driven by a bottom hole assembly 17 including a mud motor, MWD and LWD.

The drill pipe joints 10a are selected to have a limited outer diameter so that there is a clearance between the inner diameter of the liner and the outer diameter of the drill pipe joints selected to permit passage of drill cuttings and fluid.

Liner 18 is hung onto drill string 10 by a ported sub 20 including ports 24 through which a portion of the fluid flow can be jetted into annulus 21. Ports 24 extend from a bore 23 that opens to drill string center bore, through the sub body and open to the outer surface of liner. Ported sub 20 also includes ports 26 through which drilling fluid can pass. Ports 26 are sized to permit cuttings to pass. Ports 26 are not in fluid communication with ports 24.

Liner 18 carries a seal 28 such as a packer or swab cups so that fluid is prevented from communicating between ports 24, 26 through the annulus about the liner, thereby permitting the circulation to be controlled about the liner. Liner 18 also carries a liner hanger 19 for wedging between the liner and the casing 22 when setting the liner in the bore hole.

Stabilizers can be installed to control positioning of the liner and the drill string within the assembly. For example, one or more centralizers 34 can be installed about the liner and one or more stabilizers 36 can be installed between the drill string and the liner. Of course, these stabilizers/centralizers must be formed to permit fluid flow therepast. Stabilizer 36 must also permit the passage of drill cuttings. In one embodiment, stabilizer 36 is fluted to permit passage of drill cuttings and fluid.

As drilling commences, the drilling fluid is initially provided from surface through drill string 10 and is split at sub 20 to flow down both (i) through the inside (F1) of drill string 10 and (ii) through ports 24 into the annulus 21 (F2) about the outside of liner 18. Fluid then returns F3 up through the annulus between drill string 10 and liner 18. Fluid passes through ports 26 of sub 20 and returns to surface through the annulus F4 between the casing liner 22 and the drill string. Flow F2 need only be sufficient to force return flow up between the liner and the drill string, rather than between the borehole wall and the liner.

Referring to Figure 3, there is shown another apparatus and method according to the present invention. Drill string 10 extends from surface to the bottom 12 of the hole and can include conventional drilling tools including, for example, a pilot bit 14 and an under reamer 16 driven by a bottom hole assembly 17 including a mud motor, MWD and LWD.

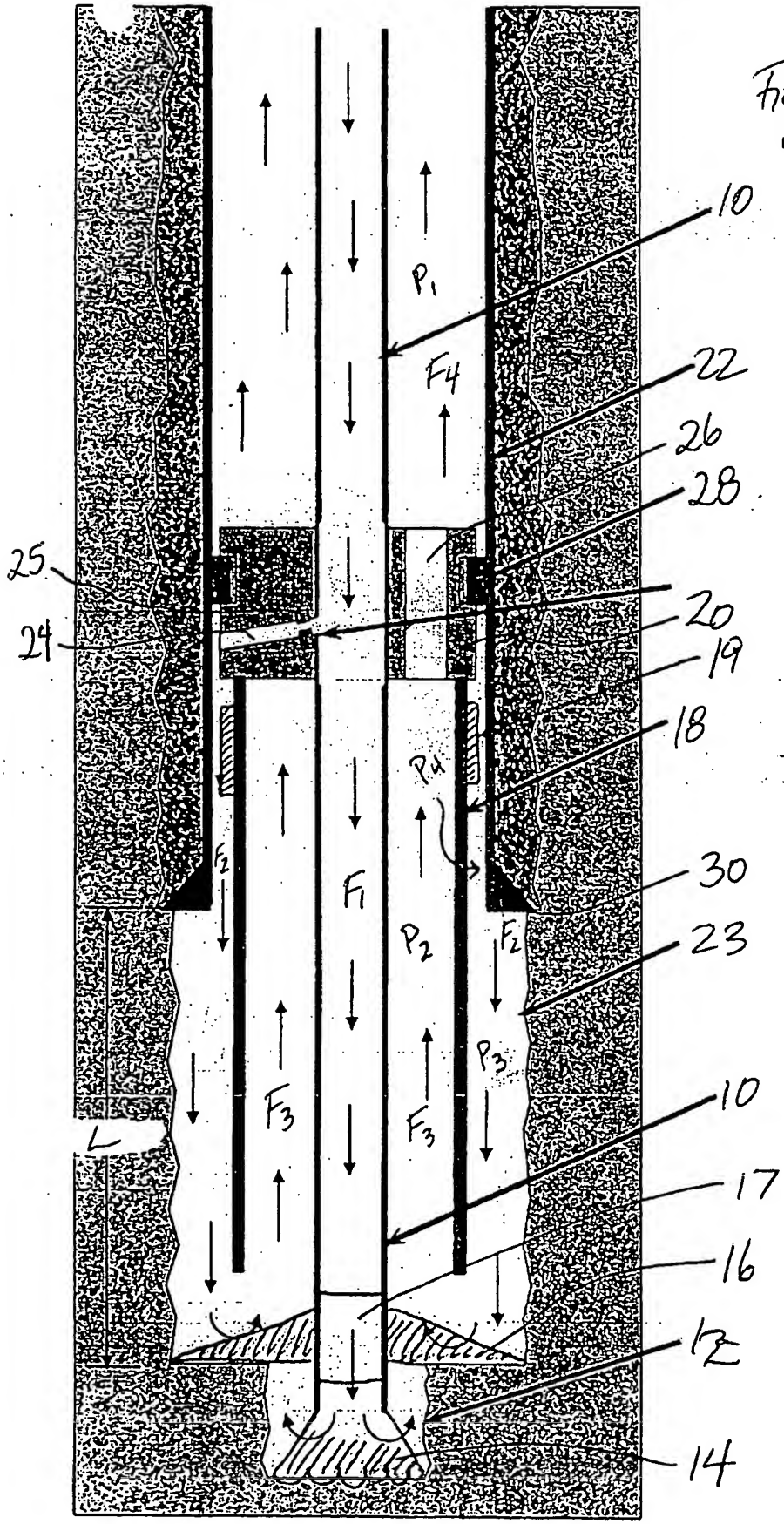
Liner 18 is hung onto drill string 10 by a ported sub 20a including ports 26 through which drilling fluid can pass axially through the wellbore between the liner inner bore and the upper surface of the sub, while returning to surface. Ports 26 are sized to permit cuttings to pass.

Sub 20 carries a seal 28 such as a packer or swab cups so that fluid is prevented from passing upwardly therepast, thereby preventing drilling fluid circulation through the annulus about the liner. Liner 18 also carries a liner hanger 19 for wedging between the liner and the casing 22 when setting the liner in the borehole.

As drilling commences, fluid in the wellbore will tend to be trapped in the annulus about the liner. Drilling fluid provided from surface through drill string 10 flows through the inside (Q1) of drill string 10 and out through the pilot bit. Due to the action of seal 28, fluid trapped in annulus 21 will create a fluid lock forcing drilling fluid to return (Q2) up through the annulus between drill string 10 and liner 18. Fluid passes through ports 26

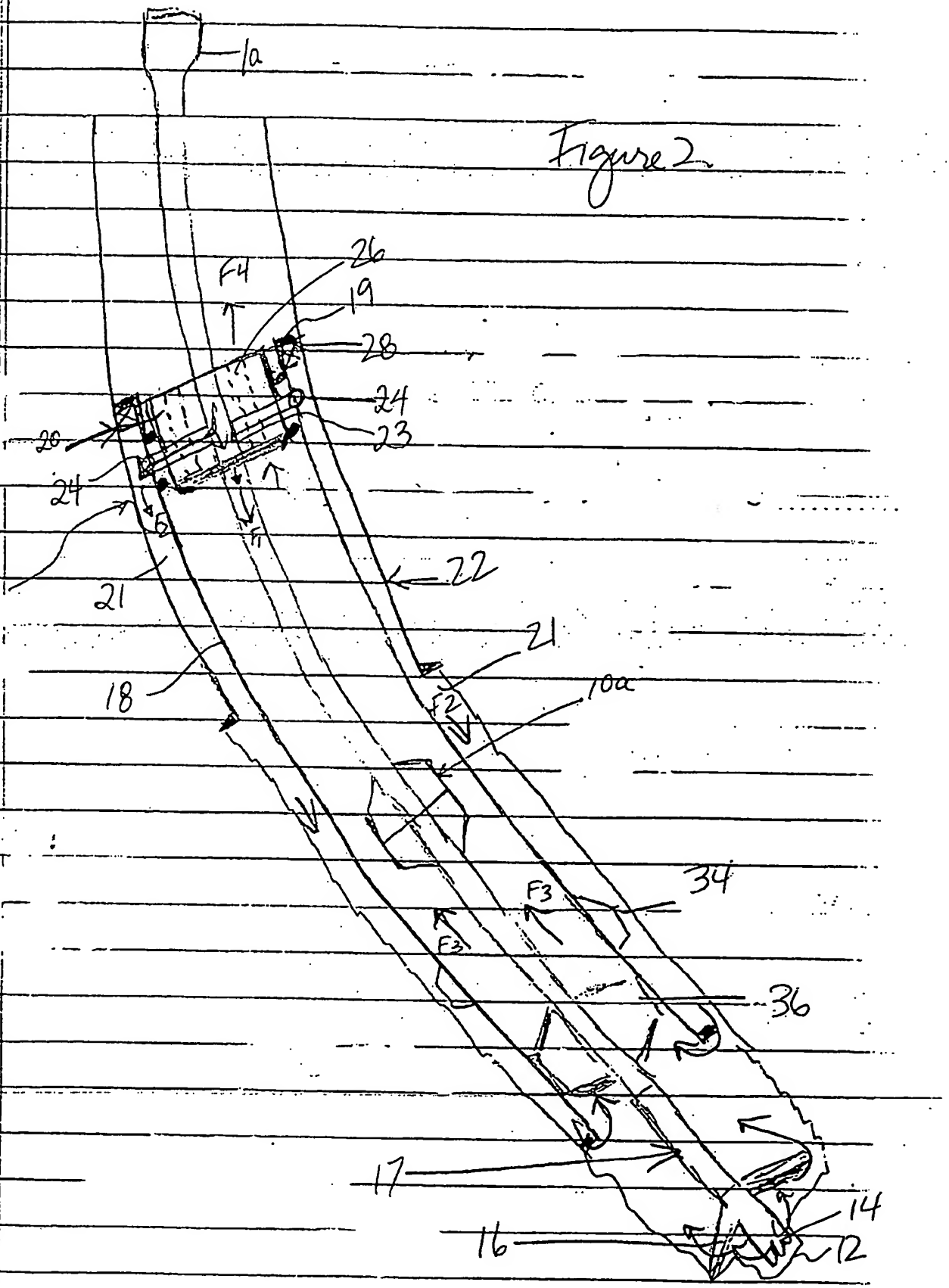
through sub 20 and returns to surface through the annulus between the casing liner 22 and the drill string.

Figure 1


10
P1
F4
22
26
28
25
20
24
19
18
P4
F2
F1
P2
F2
30
23
P3
F3
F3
10
17
16
12
14

Liner Drilling Configuration

Figure 2.



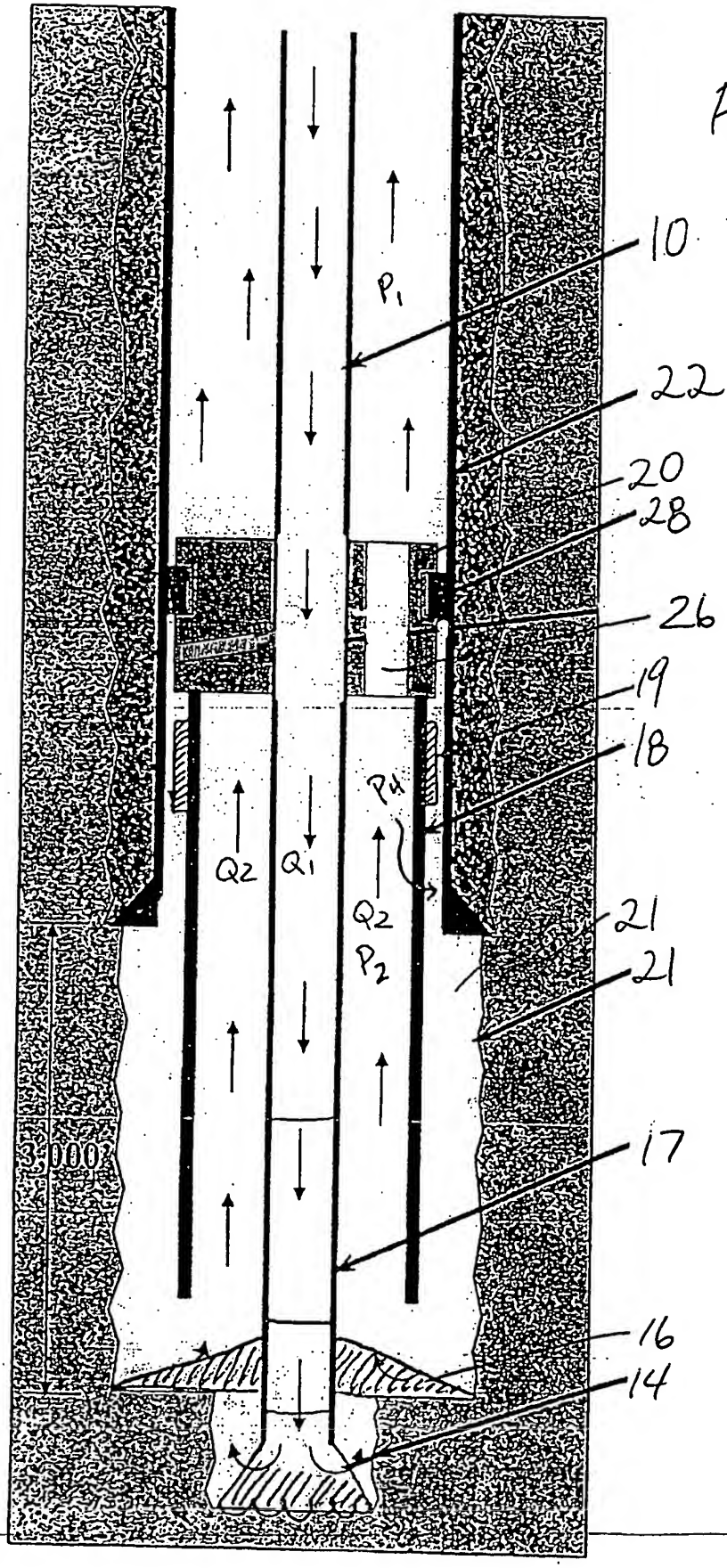


Figure 3.

Office de la propriété intellectuelle du Canada
organisme d'Industrie Canada
www.opic.gc.ca

Canadian Intellectual Property Office
An Agency of Industry Canada
www.cipo.gc.ca

8

RECEIVED
MAY 17 2003

BENNETT JONES LLP
4500 Bankers Hall East
855 - 2nd Street S.W.
CALGARY Alberta
T2P 4K7

Date : 2003/05/02

FILING CERTIFICATE

Application No. : 2,424,337
Filing Date : 2003/03/31
Expected Laid-Open Date : 2004/09/30
Your Reference : 32361-~~182B~~ 185
Title of Invention : LINER DRILLING AND CEMENTING TOOL
Applicant(s) : TESCO CORPORATION
Inventor(s) : TESSARI, ROBERT; HOUTCHENS, BRUCE

Special Notice

You are reminded that annual fees to maintain your application are needed for each one-year period between the 2nd and 20th anniversaries and must be paid on or before each anniversary. Failure to pay within the prescribed time limit will lead to abandonment of your application.

DOCKETED

Commissioner of Patents

Canada

OPIC CIPO

BENNETT JONES

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4500 Bankers Hall East
855 2nd Street SW
Calgary Alberta
Canada T2P 4K7
Tel 403.298.3100
Fax 403.265.7219

March 31, 2003

The Commissioner of Patents,
Ottawa/Hull, Canada,
K1A 0C9.

Attention: Filing Section

Dear Sir:

Re: New Canadian Patent Application in the name of TESCO CORPORATION entitled "LINER DRILLING AND CEMENTING TOOL" Our File: 32361-182B

We enclose herewith for filing a new Canadian patent application as follows:

Petition
Specification

The Commissioner is authorized to charge the official filing fee of $300.00 for a large entity to deposit account 6 000 000 15.

Respectfully submitted,

BENNETT JONES LLP

Roseann B. Caldwell:cb
Encls.

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DOCC:\NrPortbl\DMSLegal\CALDWELLR\1495441_1.DOC

Canada - Petition for Grant of a Patent

File No: 32361-182

1. The applicant, TESCO CORPORATION, whose complete address is 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA, requests the grant of a patent for an invention, entitled METHOD AND APPARATUS FOR DRILLING A BOREHOLE WITH A BOREHOLE LINER, which is described and claimed in the accompanying specification.

2. The inventor(s) is/are (1), TESSARI, Robert and (2) HOUTCHENS, Bruce whose complete address(es) is/are (1) 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA, and (2) 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA and the applicant owns in Canada the whole interest in the invention.

3. The applicant requests priority in respect of the application on the basis of the following previously regularly filed application:

Country of filing	*Application number*	*Filing date*

4. The applicant appoints BENNETT JONES LLP, whose complete address in Canada is 4500 Bankers Hall East, 855 - 2nd Street S.W. Calgary, Alberta, T2P 4K7, telephone (403) 298-3661, facsimile (403) 265-7219, as the applicant's representative in Canada, pursuant to section 29 of the *Patent Act*.

5. The applicant appoints BENNETT JONES LLP, whose complete address is 4500 Bankers Hall East, 855 - 2nd Street S.W. Calgary, Alberta, T2P 4K7, telephone (403) 298-3661, facsimile (403) 265-7219, as the applicant's patent agent.

6. The applicant requests that Figure No. 1 of the drawings accompany the abstract when it is open to public inspection under section 10 of the *Patent Act* or published.

SIGNED at Calgary, Alberta, this 13th day of March, 2003.

By: _____
BENNETT JONES LLP
Patent Agents for Applicant

PD105

LINER DRILLING & CEMENTING TOOL

Overriding Design Objective

- The LDCT system must be capable of drilling in, hanging and cementing the liner without tripping of the inner running/drilling/cementing string.

Detailed Design Capabilities

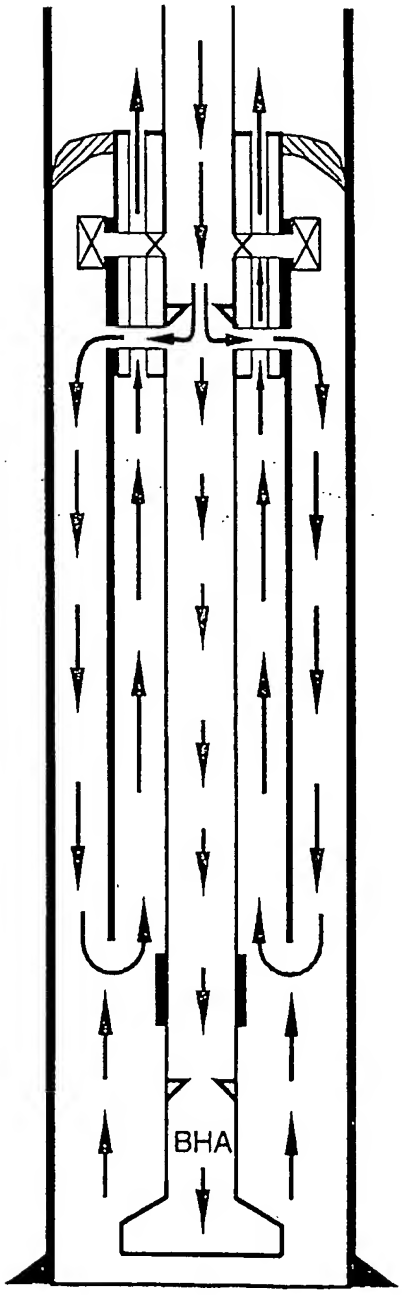
-Drill in liner while reducing ECD with partial reverse circulation with PDC Underreamer

- Hang Liner (Hydraulically set slips and pack-off)
- Release Liner (to ensure mechanical separation)
- Cement Liner (reverse cement into liner-borehole annulus)
- Close Cementing Ports (to avoid U-tubing of cement slurry
- Reverse out cement slurry from the drill pipe

TESCO

LINER DRILLING & CEMENTING TOOL

① Run In Hole



- Make up and run liner
- Run BHA
- Install Pre-Assembled Liner hanger and LDCT
- Run liner and DP to Intermediate casing shoe (Displaced returns are routed thru LDCT)

BHA COULD CONSIST OF

-10 5/8" Pilot Bit

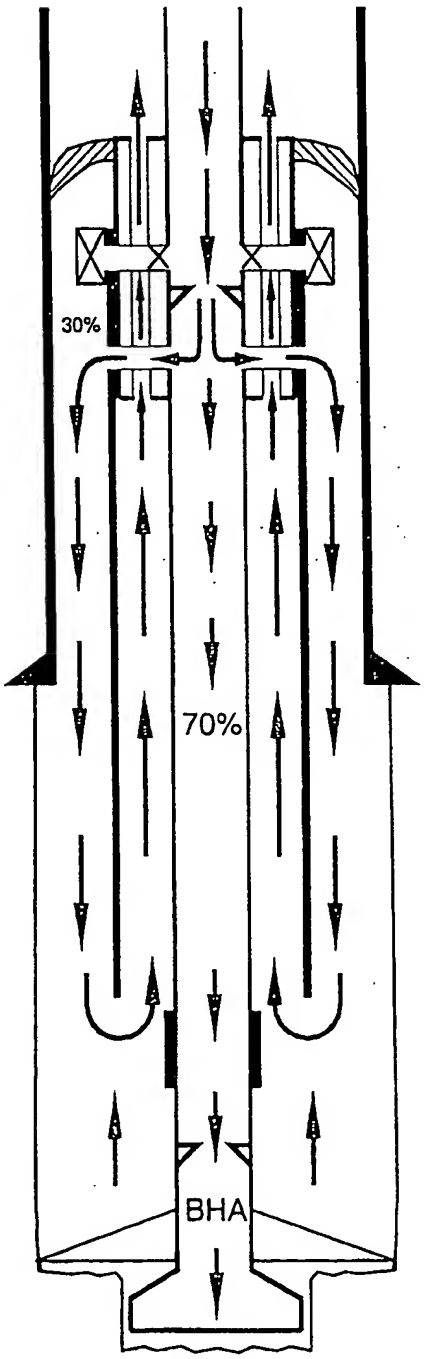
-14" Cut Tesco PDC Underreamer

- Positive Displacement Motor
- MWD/LWD as req'd
- Lower Ball Catch Sub
- Pump Out Sub

TESCO

' INER DRILLING & CEMENTING TOOL

(2)
Drill



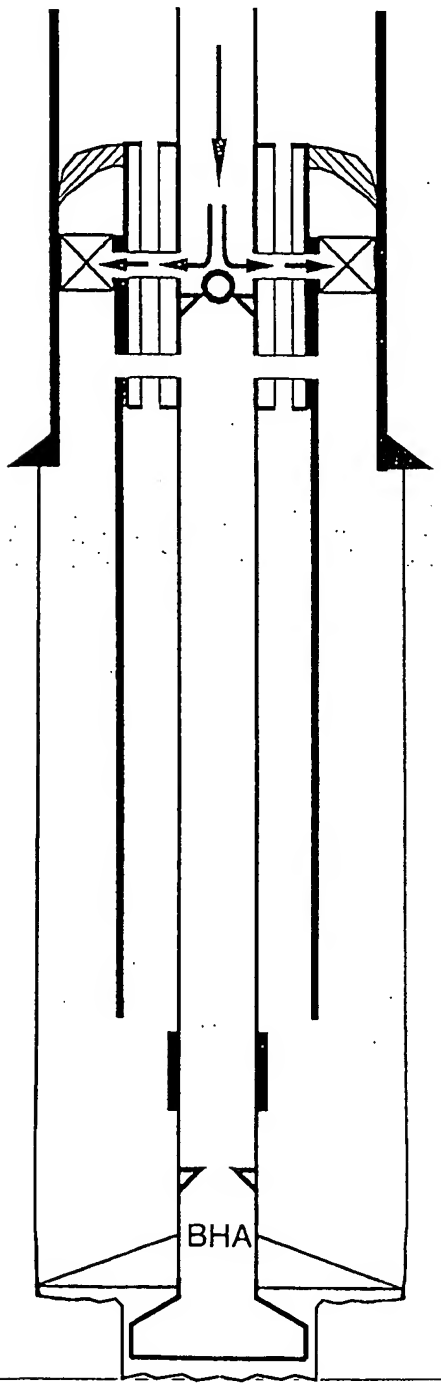
- Drill out intermediate shoe
- Drill ahead to liner total depth
- Pump mud down drill pipe
- 30% down liner casing annulus
- 70% goes down DP to PDM
- 100% flow up DP-liner annulus

TESCO

LINER DRILLING & CEMENTING TOOL

③

Hydraulic Set Hanger and Packoff



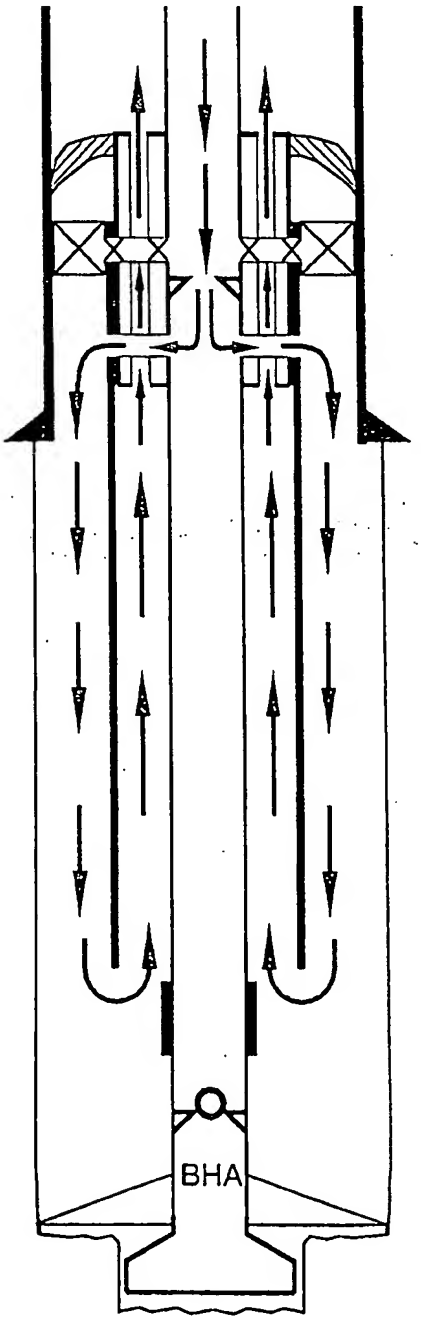
- At TD circulate hole clean
- Drop ball and hydraulic set hanger and packoff

TESCO

' INER DRILLING & CEMENTING TOOL

④

Release from Hanger



- Apply left hand torque to release LDCT from liner hanger.
- Hoist slightly to confirm liner release.
- Release ball and pump it to bottom sub.
- Establish circulation thru cementing ports
- Pump fluid caliper for cement volume determination

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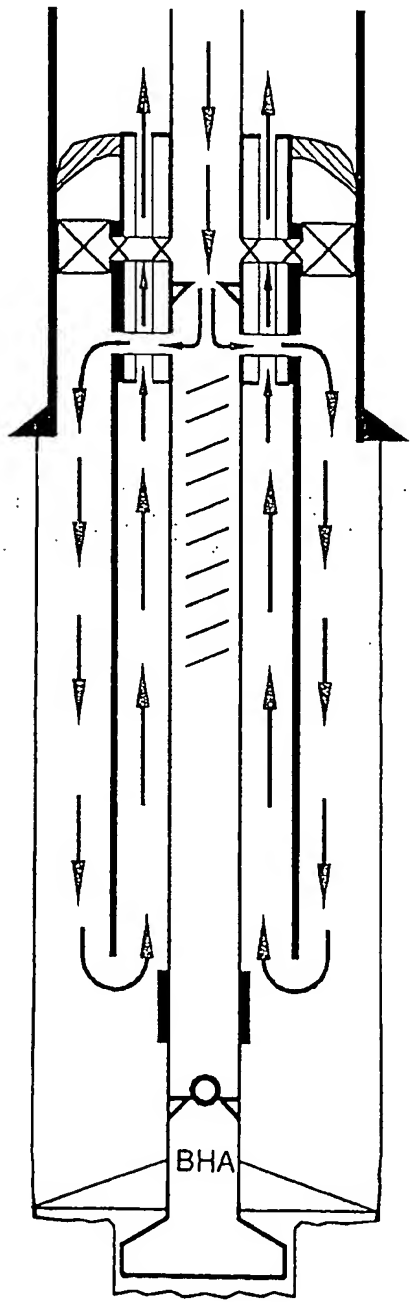
INER DRILLING & CEMENTING TOOL

(5)

Cement



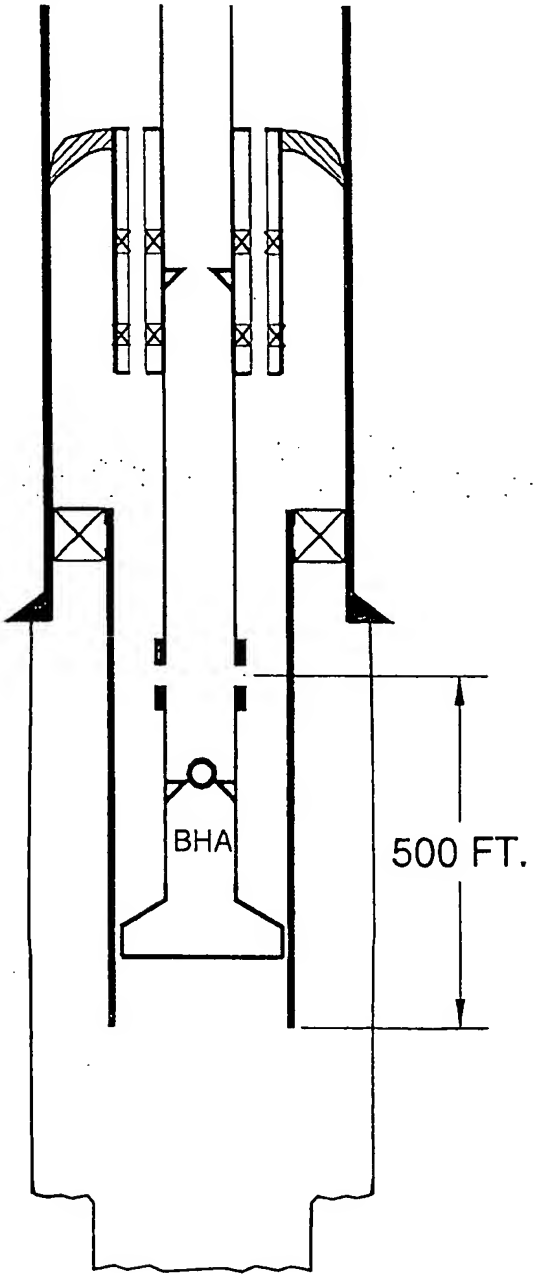
- Pump spacer and cement slurry as required down DP, out cement ports, and reversed down borehole-liner annulus.
- Displace cement to 200 ft. above LDCT (inside Drillpipe)

TESCO

' INER DRILLING & CEMENTING TOOL

(6)

Pick Up 500 ft.
Close all ports
Open Pump Out Sub



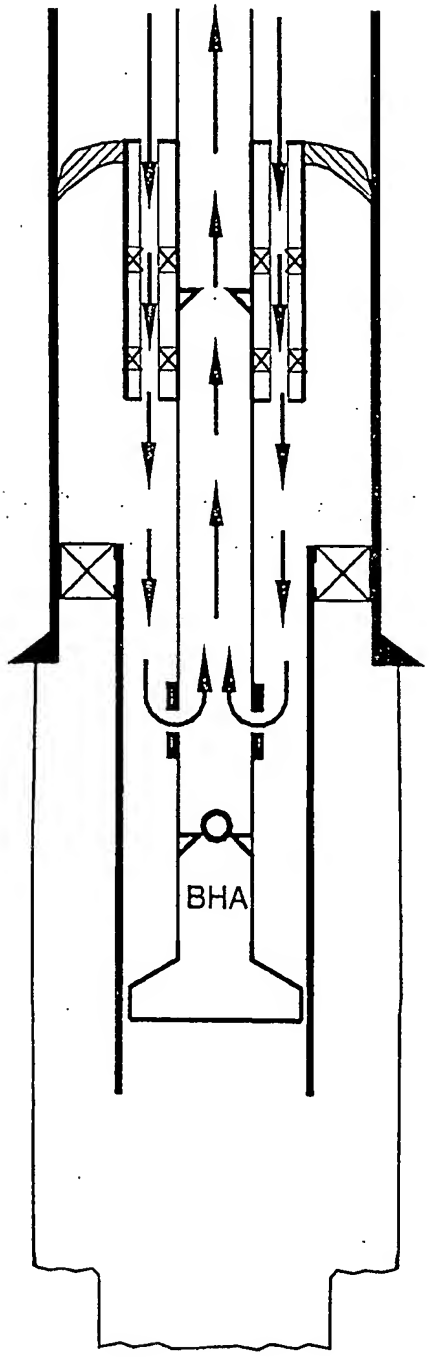
- Pickup to close cementing ports in both liner hanger and LDCT
- Hoist BHA (wet) to at least 500 ft above Liner shoe
-Pressure up to open Pump Out Sub (POS)

TESCO

LINER DRILLING & CEMENTING TOOL

(7)

Reverse circulate to
Flush drillpipe



- Reverse circulate thru Pump Out Sub down 13 3/8" casing annulus and back up DP.

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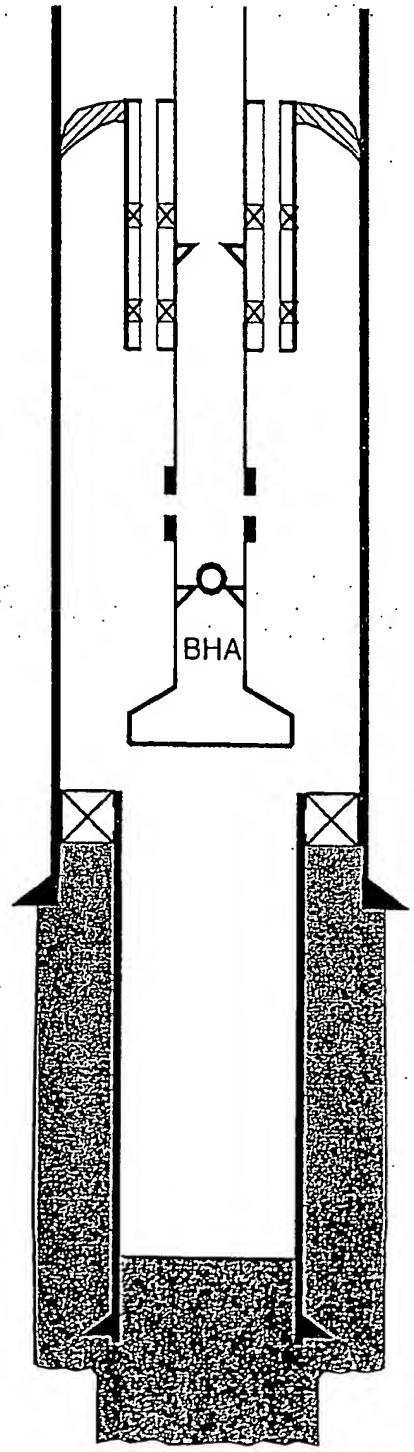
INER DRILLING & CEMENTING TOOL

(8)

Pul out of Hole



- Hoist drillpipe and BHA to surface

TESCO

LI. .ER DRILLING & CEMENTING TOOL

Summary

- This technology would enable the operator to drill in, hang and cement the 11 ¾" liner in place without the necessity to trip tubulars back thru open hole.

- There is huge potential to avoid open hole tripping problems and lost circulation problems by reducing ECD. Time will be saved by not having to trip for cementing.

TESCO

Office de la propriété intellectuelle du Canada
Un organisme d'Industrie Canada
www.opic.gc.ca

Canadian Intellectual Property Office
An Agency of Industry Canada
www.cipo.gc.ca

C

BENNETT JONES LLP
4500 Bankers Hall East
855 - 2nd Street S.W.
CALGARY Alberta
T2P 4K7

Date : 2003/06/17

FILING CERTIFICATE

Application No.	: 2,429,076	**Filing Date**	: 2003/04/17
Expected Laid-Open Date	: 2004/10/17	**Your Reference**	: 32361-186

Title of Invention : REVERSE CIRCULATION LINER DRILLING TOOL

Applicant(s) : TESCO CORPORATION

Inventor(s) : TESSARI, ROBERT; HOUTCHENS, BRUCE

Special Notice

You are reminded that annual fees to maintain your application are needed for each one-year period between the 2nd and 20th anniversaries and must be paid on or before each anniversary. Failure to pay within the prescribed time limit will lead to abandonment of your application.

Commissioner of Patents

Canada

OPIC CIPO

BENNETT JONES

Bennett Jones LLP
4500 Bankers Hall East
855 2nd Street SW
Calgary Alberta Canada T2P 4K7
Tel 403.298.3100
Fax 403.265.7219

April 17, 2003

The Commissioner of Patents,
Ottawa/Hull, Canada,
K1A 0C9.

Attention: Filing Section

Dear Sir:

Re: New Canadian Patent Application in the name of TESCO CORPORATION entitled "REVERSE CIRCULATION LINER DRILLING TOOL" Our File: 32361-186

We enclose herewith for filing a new Canadian patent application as follows:

Petition
Specification

The Commissioner is authorized to charge the official filing fee of $300.00 for a large entity to deposit account 6 000 000 15.

Respectfully submitted,

BENNETT JONES LLP

Roseann B. Caldwell:cb
Encls.

C:\NrPortbl\DMSLegal\BONNEYC\1508793_1.DO
C

Canada - Petition for Grant of a Patent

File No: 32361-186

1. The applicant, TESCO CORPORATION, whose complete address is 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA, requests the grant of a patent for an invention, entitled REVERSE CIRCULATION LINER DRILLING TOOL, which is described and claimed in the accompanying specification.

2. The inventor(s) is/are (1), TESSARI, Robert and (2) HOUTCHENS, Bruce whose complete address(es) is/are (1) 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA, and (2) 6204 – 6A Street SE, Calgary, Alberta T2H 2B7 CANADA and the applicant owns in Canada the whole interest in the invention.

3. The applicant requests priority in respect of the application on the basis of the following previously regularly filed application:

Country of filing	*Application number*	*Filing date*

4. The applicant appoints BENNETT JONES LLP, whose complete address in Canada is 4500 Bankers Hall East, 855 - 2nd Street S.W. Calgary, Alberta, T2P 4K7, telephone (403) 298-3661, facsimile (403) 265-7219, as the applicant's representative in Canada, pursuant to section 29 of the *Patent Act*.

5. The applicant appoints BENNETT JONES LLP, whose complete address is 4500 Bankers Hall East, 855 - 2nd Street S.W. Calgary, Alberta, T2P 4K7, telephone (403) 298-3661, facsimile (403) 265-7219, as the applicant's patent agent.

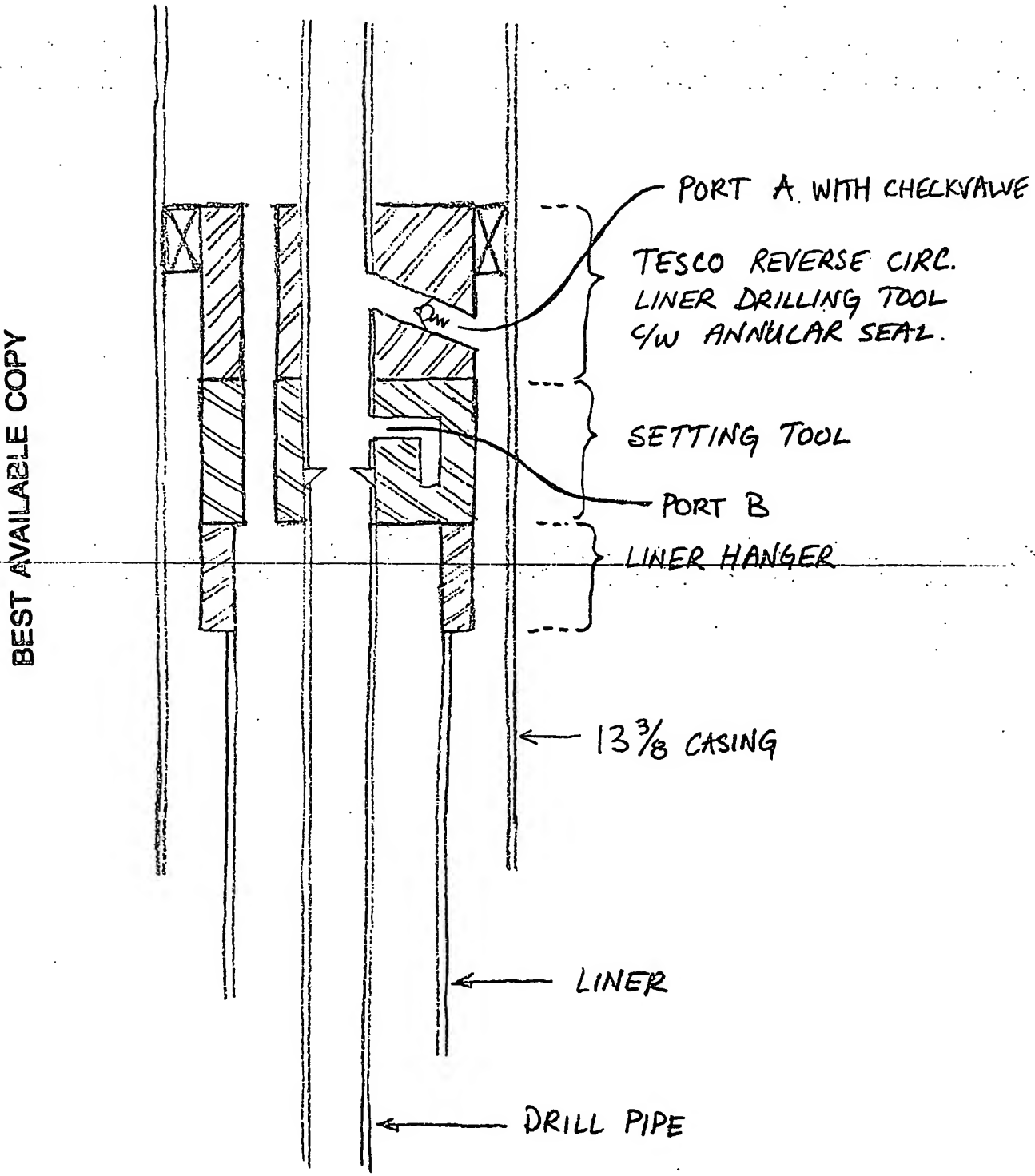
6. The applicant requests that Figure No. 1 of the drawings accompany the abstract when it is open to public inspection under section 10 of the *Patent Act* or published.

SIGNED at Calgary, Alberta, this 17th day of April, 2003.

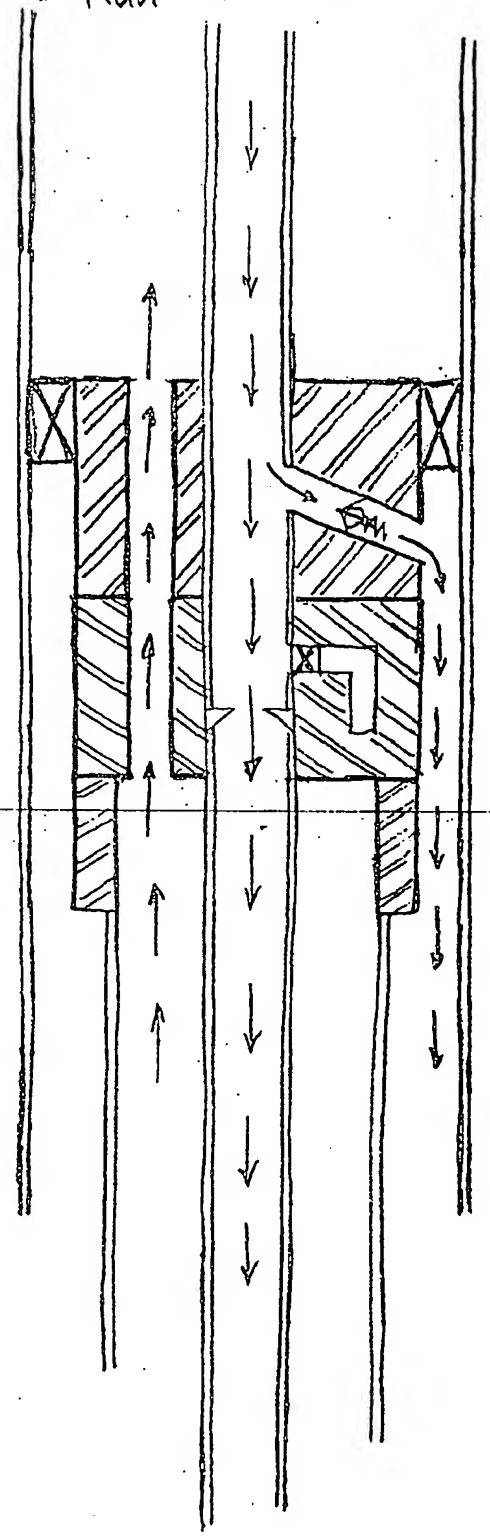
By: _____
BENNETT JONES LLP
Patent Agents for Applicant

PD105

TESCO REVERSE CIRCULATION LINER DRILLING TOOL (RCLDT)

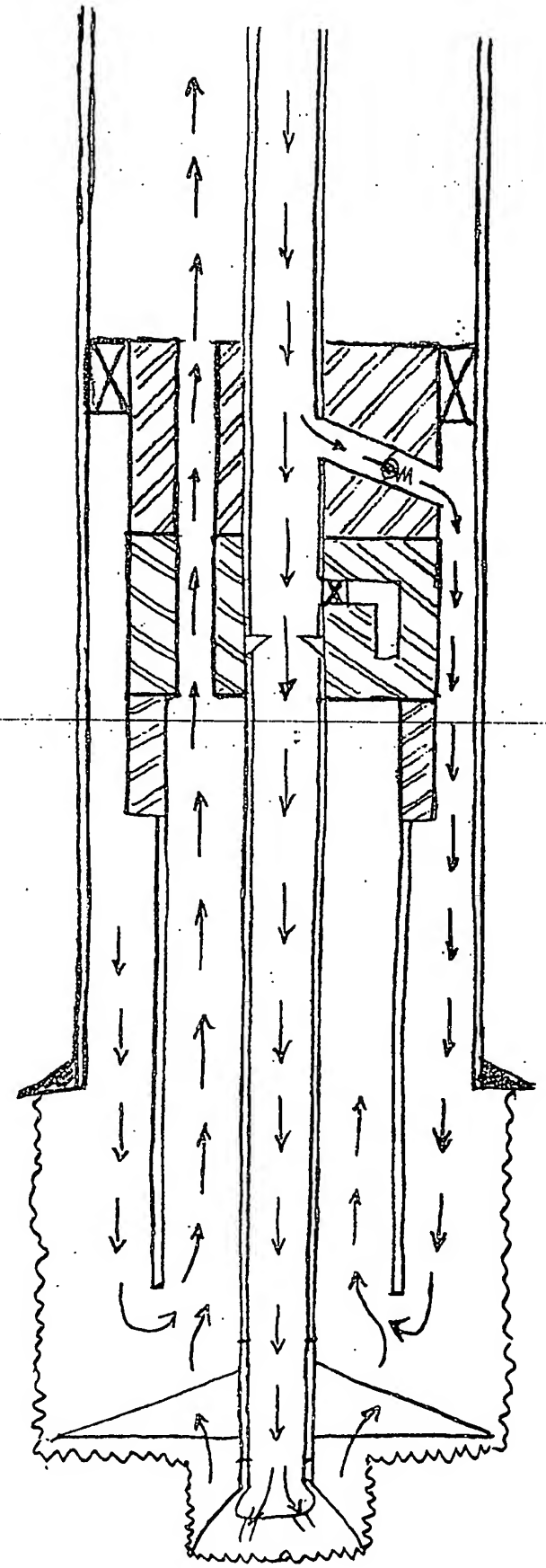


1. Run In Hole

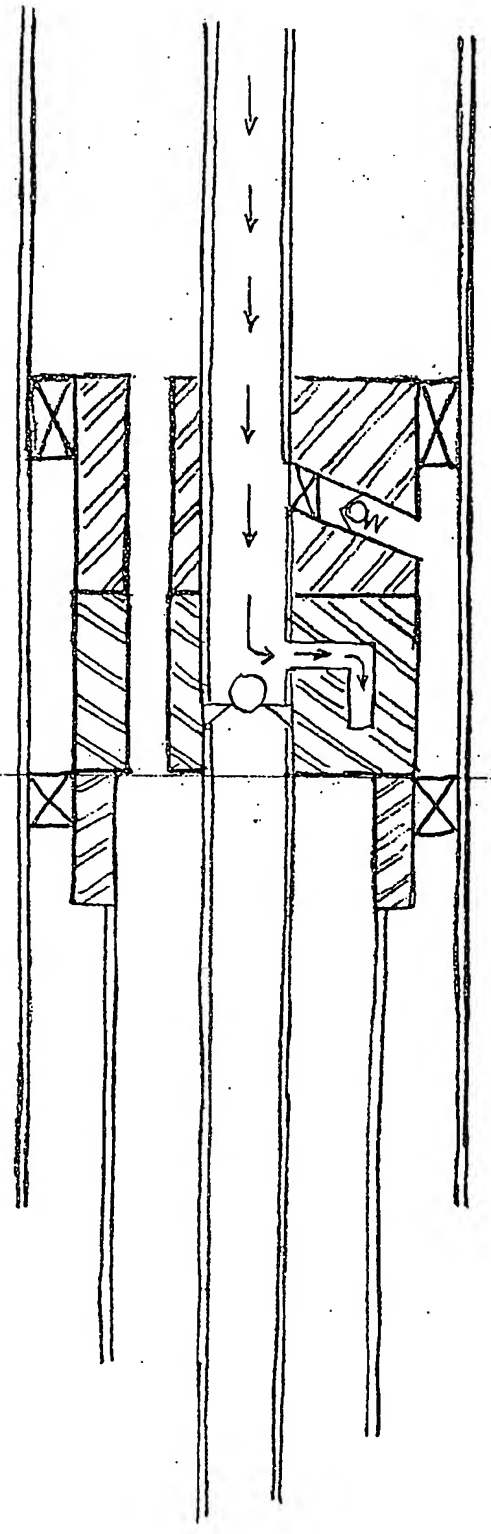


1. Port A open
2. Port B closed

2. Drill

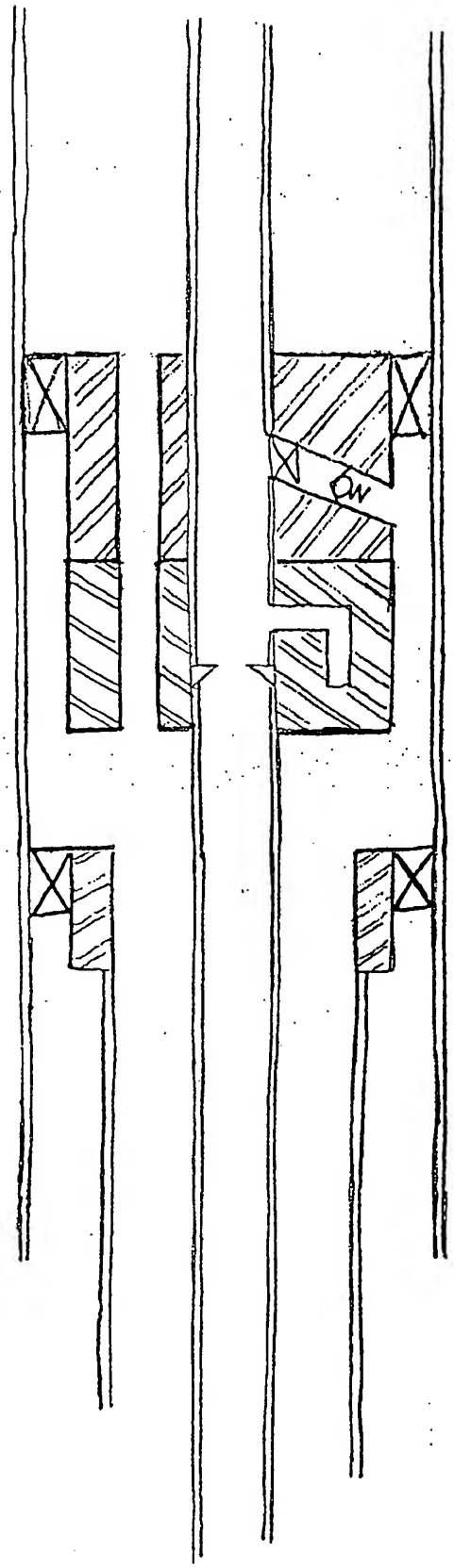


3. Set Hanger



1. Drop Ball
2. Close port A
3. Open port B
4. Ball lands on seat
5. Pressure up, set hanger through pressure applied through port B

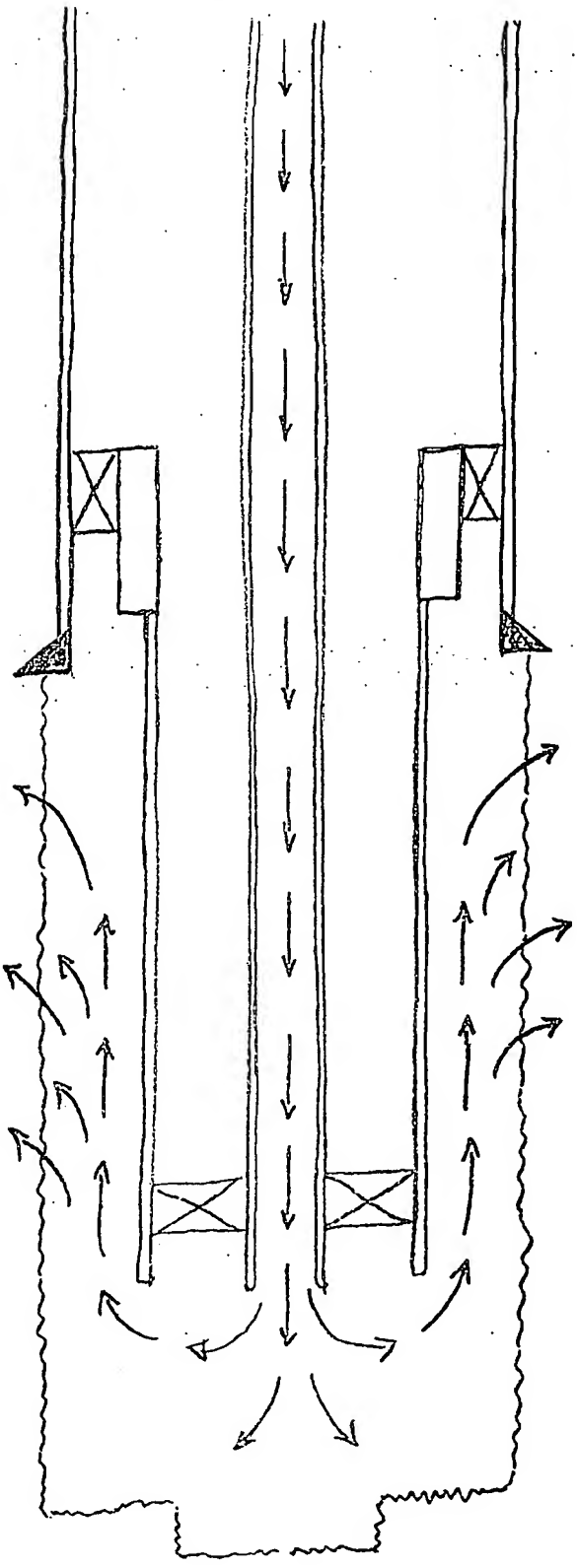
4. Release from Hanger and POOH



1. Pressure up to release from hanger
2. Pick up
3. Set down to compress packer
4. POOH

5. RIH with Cement Ass'y

Squeeze Cement



D.

From: "Ceschini, Kara" <kara_ceschini@tescocorp.com>
To: 'Roseann Caldwell' <CALDWELLR@bennettjones.ca>
Date: 2/26/04 3:45PM
Subject: RE: Inventor information needed

Roseann,

Following is the information you requested:

Keith Evert Beierbach
Calgary Resident
Canadian Citizen

Kevin Nikiforuk
Calgary Resident
Canadian Citizen

Bruce David Houtchens
Spring, Texas (a suburb of Houston)
US Citizen

Robert Melvin Tessari
Calgary Resident
Canadian Citizen

If you need anything further, feel free to contact me.

Regards,
Kara Ceschini
Legal Assistant
Tesco Corporation
6204 - 6A Street S.E.
Calgary, AB, Canada T2H 2B7

direct: (403) 212 7266
fax: (403) 720 2862
website: www.tescocorp.com

-----Original Message-----
From: Roseann Caldwell [mailto:CALDWELLR@bennettjones.ca]
Sent: Thursday, February 26, 2004 10:59 AM
To: kara_ceschini@tescocorp.com
Subject: Inventor information needed

Kara,

For some recently filed applications, we need the full legal names, residence cities and citizenship for the following individuals.

Evert Beierbach
Kevin Nikiforuk
Bruce Houtchens
Bob Tessari

Will you please gather that information and send it along to me. Thanks.

Roseann Caldwell
Bennett Jones LLP
4500 Bankers Hall East
855 - 2nd Street SW
Calgary, Alberta T2P 4K7
Canada
tel. (403) 298-3661
fax. (403) 265-7219

[redacted]

E

From: "Angman, Per" <per_angman@tescocorp.com>
To: 'Roseann Caldwell' <CALDWELLR@bennettjones.ca>
Date: 3/10/03 3:30PM
Subject: RE: Reverse circulation liner drilling

I'll get some info. Now this will be highest priority, the way Bob talked it seemed that the application was already in?

-----Original Message-----
From: Roseann Caldwell [mailto:CALDWELLR@bennettjones.ca]
Sent: Monday, March 10, 2003 3:20 PM
To: per_angman@tescocorp.com
Subject: RE: Reverse circulation liner drilling

I havn't seen Bob Tessari in years. Did he send it by mail or give it to Bill Rice or something else?

Roseann Caldwell
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Canada
tel. (403) 298-3661
fax. (403) 265-7219

>>> "Angman, Per" <per_angman@tescocorp.com> 03/10/03 03:17PM >>>
Bob T gave you a hand drawing.

-----Original Message-----
From: Roseann Caldwell [mailto:CALDWELLR@bennettjones.ca]
Sent: Monday, March 10, 2003 2:55 PM
To: per_angman@tescocorp.com
Subject: Re: Reverse circulation liner drilling

This invention has not been disclosed to me, unless it went by another name.

Roseann Caldwell
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fax. (403) 265-7219

>>> "Angman, Per" <per_angman@tescocorp.com> 03/10/03 11:12AM >>>
What is you current status on this idea?

[redacted]

From: "Rowan, Shirley" <intlops@tescocorp.com>
To: "'caldwellr@bennettjones.ca'" <caldwellr@bennettjones.ca>
Date: 3/10/03 4:16PM
Subject: Reverse Circulation Liner Drilling

Forwarded to you per Per Angman's request. Any problems opening, please contact me at 259 0462. This is a 3-page document- 1st page only is coloured.
<<Reverse Circulation Liner Drilling.pdf>>

CC: "Angman, Per" <per_angman@tescocorp.com>

F

From: Roseann Caldwell
To: Angman, Per
Date: 3/31/03 4:47PM
Subject: Re: reverse circulation liner drilling, powerpoint presentation, ppt,

Per, the presentation contained information, mainly with respect to the cementing features, that were not described in the earlier application. So I packaged it up and filed the presentation as a provisional patent application in order to avoid disclosure problems later on. I will send a copy of the application as filed over with a reporting letter.

Roseann Caldwell
Bennett Jones LLP
4500 Bankers Hall East
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Calgary, Alberta T2P 4K7
Canada
tel. (403) 298-3661
fax. (403) 265-7219

>>> "Angman, Per" <per_angman@tescocorp.com> 03/31/03 10:34AM >>>
We need to discuss this asap. Bob is making a presentation to [redacted]
this afternoon. Where do we stand with this application?

> <<pres-master.ppt>>
>
>
>

From: Roseann Caldwell
To: Angman, Per
Date: 3/31/03 12:19PM
Subject: Re: reverse circulation liner drilling, powerpoint presentation, ppt,

The application was filed in mid March. I will take a look at the Power Point presentation, just to make sure that there is nothing in the presentation that wasn't in the application.

Roseann Caldwell
Bennett Jones LLP
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Canada
tel. (403) 298-3661
fax. (403) 265-7219

>>> "Angman, Per" <per_angman@tescocorp.com> 03/31/03 10:34AM >>>
We need to discuss this asap. Bob is making a presentation to [redacted] this afternoon. Where do we stand with this application?

> <<pres-master.ppt>>
>
>
>

32361 - newest G one.

From: "Angman, Per" <per_angman@tescocorp.com>
To: 'Roseann Caldwell' <CALDWELLR@bennettjones.ca>
Date: 4/17/03 7:49AM
Subject: RE: Urgent patent filings

ok, I'll send something today.

-----Original Message-----
From: Roseann Caldwell [mailto:CALDWELLR@bennettjones.ca]
Sent: Wednesday, April 16, 2003 9:02 PM
To: per_angman@tescocorp.com
Cc: Cara Bonney; Susan Rancourt
Subject: Urgent patent filings

The last time we met, you mentioned that there might be another "Reverse Circulation" power point presentation that needs to be filed.

So, I just wanted to let you know that I will be out of the office from April 18 to April 27, 2003. If you need something filed during that period, please call/email Sue Rancourt 298-3051/ rancourts@bennettjones.ca. Sue is a patent agent and will be around next week.

I will be in the office tomorrow: Thursday April 17. My first day back after that is Monday April 28.

Roseann Caldwell
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